

What is claimed is:

1. A method of controlling an intermodulation distortion of a non-reciprocal device having at least one ferrimagnetic member, comprising the step of:

controlling the intermodulation distortion by controlling a ferromagnetic resonance linewidth of the ferrimagnetic member.

2. A method as defined in claim 1,

wherein the ferromagnetic resonance linewidth is controlled by controlling the porosity of the ferrimagnetic member.

3. A method as defined in claim 1,

wherein the ferromagnetic resonance linewidth is controlled by controlling the anisotropy of the ferrimagnetic member.

4. A method as defined in claim 1,

wherein a ferromagnetic resonance linewidth of the ferrimagnetic member is set to a value smaller than 15[Oe].

5. A method as defined in claim 1,

wherein the intermodulation distortion is controlled so as to assume a value of -75 dBc or less.

6. A method of controlling an intermodulation distortion of a non-reciprocal device having at least one ferrimagnetic member formed of a ferrimagnetic material, comprising the step of:

controlling the intermodulation distortion by controlling a ferromagnetic resonance linewidth of the ferrimagnetic material.

7. A method as defined in claim 6,

wherein the ferromagnetic resonance linewidth is controlled by controlling the porosity of the ferrimagnetic material.

8. A method as defined in claim 6,

wherein the ferromagnetic resonance linewidth is controlled by controlling the anisotropy of the ferrimagnetic material.

9. A method as defined in claim 6,

wherein a ferromagnetic resonance linewidth of the ferrimagnetic material is set to a value smaller than 15[Oe].

10. A method as defined in claim 6,

wherein the intermodulation distortion is controlled so as to assume a value of -75 dBc or less.

11. A method of controlling an intermodulation distortion of a non-reciprocal device having at least one ferrimagnetic member formed of a ferrimagnetic material, comprising the step of:

controlling the intermodulation distortion by controlling a ferromagnetic resonance linewidth of the ferrimagnetic material,

wherein the ferromagnetic resonance linewidth is controlled by making a composition of the ferrimagnetic material up of the following general formula:

$(Y_{3-2x-z+w}Ca_{2x+z})(Fe_{5-x-y-z-w}V_xAl_yZr_z)O_{12}$ ($0 \leq x \leq 0.7$, $0 \leq y \leq 0.7$, $0.05 \leq z \leq 0.4$, and $0.01 \leq w \leq 0.03$).

12. A method of controlling an intermodulation distortion of a non-reciprocal device having at least one ferrimagnetic member formed of a ferrimagnetic material, comprising the step of:

controlling the intermodulation distortion by controlling a ferromagnetic resonance linewidth of the ferrimagnetic material,

wherein the ferromagnetic resonance linewidth is controlled by making a composition of the ferrimagnetic material up of the following general formula:

$(Y_{3-2x-z+w}Ca_{2x+z})(Fe_{5-x-y-z-w}V_xAl_yZr_z)O_{12}$ ($0 \leq x \leq 0.42$, $0 \leq y \leq 0.44$, $0.08 \leq z \leq 0.2$, and $0.01 \leq w \leq 0.03$) when a saturation magnetic flux density assumes a value of 1250 Gauss or thereabouts.

13. A method of controlling an intermodulation distortion of a non-reciprocal device having at least one ferrimagnetic member formed of a ferrimagnetic material, comprising the step of:

controlling the intermodulation distortion by controlling a ferromagnetic resonance linewidth of the ferrimagnetic material,

wherein the ferromagnetic resonance linewidth is controlled by making a composition of the ferrimagnetic material up of the following general formula:

$(Y_{3-2x-z+w}Ca_{2x+z})(Fe_{5-x-y-z-w}V_xAl_yZr_z)O_{12}$ ($0 \leq x \leq 0.1$, $0 \leq y \leq 0.1$, $z=0.1$, and $0.01 \leq w \leq 0.03$) when a saturation magnetic flux density assumes a value of 1750 Gauss or thereabouts.

14. A method of controlling an intermodulation distortion of a non-reciprocal device having at least one ferrimagnetic member formed of a ferrimagnetic material, comprising the step of:

controlling the intermodulation distortion by controlling a ferromagnetic resonance linewidth of the ferrimagnetic material,

wherein the ferromagnetic resonance linewidth is controlled by making a composition of the ferrimagnetic material up of the following general formula:

$(Y_{3-2x-z+w}Ca_{2x+z})(Fe_{5-x-y-z-w}V_xAl_yZr_z)O_{12}$ ($0.3 \leq x \leq 0.7$, $0 \leq y \leq 0.42$, $0.2 \leq z \leq 0.3$, and $0.01 \leq w \leq 0.03$) when a saturation magnetic flux density assumes a value of 750 Gauss or thereabouts.

15. A method of suppressing an intermodulation distortion of a non-reciprocal device, wherein the non-reciprocal device comprises at least one ferrimagnetic member, a center conductor disposed adjacent to the ferrimagnetic member, and a magnet to apply a d.c. magnetic field to the ferrimagnetic member and the center conductor, comprising the step of:

suppressing the intermodulation distortion, which would arise when two or more frequency signals are applied to the center conductor, by controlling a ferromagnetic resonance linewidth of the ferrimagnetic member.

16. A method as defined in claim 15,

wherein the intermodulation distortion assumes a value of -75 dBc or less.

17. A ferrimagnetic material, having:

a composition expressed by a general formula

$(Y_{3-2x-z+w}Ca_{2x+z})(Fe_{5-x-y-z-w}V_xAl_yZr_z)O_{12}$ and satisfies the following requirements;

$0 \leq x \leq 0.7$,

$0 \leq y \leq 0.7$,

$0.05 \leq z \leq 0.4$, and

$$0.01 \leq w \leq 0.03.$$

18. A ferrimagnetic material as defined in claim 17,

wherein, in a case where a saturation magnetic flux density assumes a value of 1250 Gauss or thereabouts, the ferrimagnetic material satisfies the following requirements;

$$0 \leq x \leq 0.42,$$

$$0 \leq y \leq 0.44, \text{ and}$$

$$0.08 \leq z \leq 0.2.$$

19. A ferrimagnetic material as defined in claim 17,

wherein, in a case where a saturation magnetic flux density assumes a value of 1750 Gauss or thereabouts, the ferrimagnetic material satisfies the following requirements;

$$0 \leq x \leq 0.1,$$

$$0 \leq y \leq 0.1, \text{ and}$$

$$z = 0.1.$$

20. A ferrimagnetic material as defined in claim 17,

wherein, in a case where a saturation magnetic flux density assumes a value of 750 Gauss or thereabouts, the ferrimagnetic material satisfies the following requirements;

$$0.3 \leq x \leq 0.7,$$

$$0 \leq y \leq 0.42, \text{ and}$$

$$0.2 \leq z \leq 0.3.$$

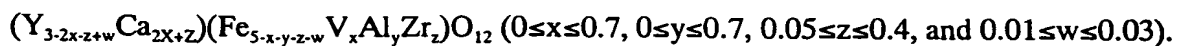
21. A ferrimagnetic material as defined in claim 17,

wherein a ferromagnetic resonance linewidth of the ferrimagnetic material is set to a value smaller than 15[Oe].

22. A ferrimagnetic material, comprising:

Y, Ca, Fe, V, Al, Zr and O

wherein, the Y, the Ca, the Fe, the V, the Al, the Zr and the O satisfy the following formula:



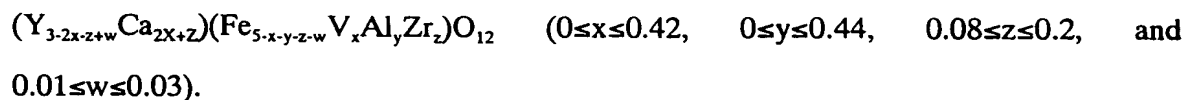
23. A ferrimagnetic material as defined in claim 22,

wherein, a ferromagnetic resonance linewidth of the ferrimagnetic material is set to a value smaller than 15[Oe].

24. A ferrimagnetic material, comprising:

Y, Ca, Fe, V, Al, Zr and O

wherein, the Y, the Ca, the Fe, the V, the Al, the Zr and the O satisfy the following formula:



25. A ferrimagnetic material as defined in claim 24,

wherein, a ferromagnetic resonance linewidth of the ferrimagnetic material is set to a value smaller than 15[Oe].

26. A ferrimagnetic material, comprising:

Y, Ca, Fe, V, Al, Zr and O

wherein, the Y, the Ca, the Fe, the V, the Al, the Zr and the O satisfy the following formula:



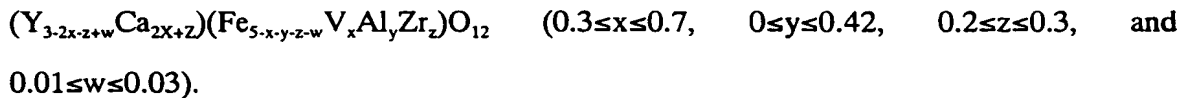
27. A ferrimagnetic material as defined in claim 26,

wherein, a ferromagnetic resonance linewidth of the ferrimagnetic material is set to a value smaller than 15[Oe].

28. A ferrimagnetic material, comprising:

Y, Ca, Fe, V, Al, Zr and O

wherein, the Y, the Ca, the Fe, the V, the Al, the Zr and the O satisfy the following formula:



29. A ferrimagnetic material as defined in claim 28,

wherein, a ferromagnetic resonance linewidth of the ferrimagnetic material is set to a value smaller than 15[Oe].

30. A non-reciprocal device, comprising:

at least one ferrimagnetic member made of a ferrimagnetic material,

wherein the ferrimagnetic material has a composition expressed by a general formula $(Y_{3-2x-z+w}Ca_{2x+z})(Fe_{5-x-y-z-w}V_xAl_yZr_z)O_{12}$ and satisfies the following requirements;

$0 \leq x \leq 0.7, 0 \leq y \leq 0.7, 0.05 \leq z \leq 0.4, \text{ and } 0.01 \leq w \leq 0.03;$

a center conductor disposed opposite the ferrimagnetic member; and

at least one magnet applying a direct current magnetic field to the center

conductor and the ferrimagnetic member.

31. A non-reciprocal device as defined in claim 30,

wherein, in a case where a saturation magnetic flux density assumes a value of 1250 Gauss or thereabouts, the ferrimagnetic material satisfies the following requirements;

$0 \leq x \leq 0.42$, $0 \leq y \leq 0.44$, and $0.08 \leq z \leq 0.2$.

32. A non-reciprocal device as defined in claim 30,

wherein, in a case where a saturation magnetic flux density assumes a value of 1750 Gauss or thereabouts, the ferrimagnetic material satisfies the following requirements;

$0 \leq x \leq 0.1$, $0 \leq y \leq 0.1$, and $z = 0.1$.

33. A non-reciprocal device as defined in claim 30,

wherein, in a case where a saturation magnetic flux density assumes a value of 750 Gauss or thereabouts, the ferrimagnetic material satisfies the following requirements;

$0.3 \leq x \leq 0.7$, $0 \leq y \leq 0.42$, and $0.2 \leq z \leq 0.3$.

34. A non-reciprocal device as defined in claim 30,

wherein a ferromagnetic resonance linewidth of the ferrimagnetic material is set to a value smaller than 15[Oe].

35. A non-reciprocal device as defined in claim 30,

wherein the intermodulation distortion of the non-reciprocal device assumes a value of -75 dBc or less.

36. A non-reciprocal device as defined in claim 30,
wherein the non-reciprocal device is distributed parameter type.

37. A non-reciprocal device as defined in claim 30,
wherein the non-reciprocal device is lumped parameter type.

38. A non-reciprocal device as defined in claim 30,
wherein the non-reciprocal device is substrate type.

39. A non-reciprocal device, comprising:
at least one ferrimagnetic member made of a ferrimagnetic material, wherein a
ferromagnetic resonance linewidth of the ferrimagnetic material is set to a value smaller
than 15[Oe];
a center conductor disposed opposite the ferrimagnetic member; and
at least one magnet applying a direct current magnetic field to the center
conductor and the ferrimagnetic member.